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# 1968

ANNUAL  
REPORT

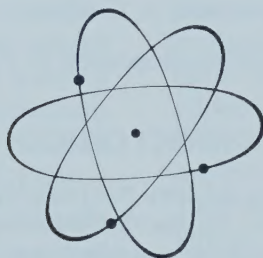
**ELDORADO NUCLEAR LIMITED**  
*Formerly Eldorado Mining and Refining Ltd*  
and its subsidiary ELDORADO AVIATION LIMITED





# ANNUAL REPORT

For the Year Ended December 31, 1968



## ELDORADO NUCLEAR LIMITED

*formerly Eldorado Mining and Refining Limited*  
and Subsidiary ELDORADO AVIATION LIMITED

# ELDORADO NUCLEAR LIMITED

Head Office: Suite 800, 151 Slater St., Ottawa 4, Canada  
General Administration Office: Port Hope, Ontario, Canada

## DIRECTORS

Marcel Bélanger      W. J. Bennett      Roger Blais      W. M. Gilchrist\*  
W. F. James\*      W. S. Kirkpatrick      Gordon Lawson\*

\*Members of Executive Committee

## OFFICERS

President: W. M. Gilchrist

Vice-President, Refining and Sales — J. C. Burger

Secretary: R. C. Powell      Treasurer: J. C. Orr

Director of Administration: C. Baschenis

## DIVISIONAL MANAGERS

Mining and Exploration Division: A. R. Allen      Refinery: R. M. Berry

Research and Development: G. F. Colborne

## DISTRICT OFFICES

Refining and Sales: Port Hope, Ontario

Beaverlodge Mine: P.O. Box 7010, Eldorado, Saskatchewan

Metallurgical Laboratories: Tunney's Pasture, Ottawa, Canada

Western Purchasing and Employment Office: 10040 - 105th Street, Edmonton, Alberta

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## ELDORADO AVIATION LIMITED

HEAD OFFICE: Suite 800, 151 Slater St., Ottawa 4, Canada

OPERATIONS OFFICE: No. 11 Hangar, Municipal Airport, Edmonton, Alberta

## DIRECTORS

W. J. Bennett      A. B. Caywood      W. M. Gilchrist  
P. L. P. Macdonnell      R. C. Powell

## OFFICERS

President: W. M. Gilchrist

Secretary: R. C. Powell      Treasurer: J. C. Orr

General Manager: G. F. Frank

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Eldorado Nuclear Limited Sales Agencies Abroad

Europe: N. V. Internationale Ertshandel "Wambesco", P.O. Box 1439, Westerkade 2, Rotterdam, Netherlands

Japan: Marubeni-Iida Co., Ltd. P.O. Box Central 595, Tokyo.



## PRESIDENT'S LETTER

613-237-4340

The Honourable J. J. Greene,  
Minister of Energy, Mines and Resources,  
Ottawa, Ontario

Sir,

On behalf of the Board of Directors, and in accordance with Section 85(3) of The Financial Administration Act, I have the honour to submit the Annual Report of Eldorado Nuclear Limited (formerly Eldorado Mining and Refining Limited) and its subsidiary Company, Eldorado Aviation Limited, for the year ended December 31, 1968.

Although the production of uranium in Canada in 1968 was slightly less than in 1967, the actual decrease was not very significant. The 1968 production totalled approximately 8,198,000 pounds of  $U_3O_8$ , down only 159,000 pounds from 1967. Deliveries continued under the contract with the United Kingdom Atomic Energy Authority. This is the only contract remaining active of those that were developed during the surge of demand experienced in the nineteen-fifties. The quantity of  $U_3O_8$  in concentrates placed in the Canadian Government stockpile was approximately 3,868,000 pounds short of the permissible total. Only one company of those holding stockpiling agreements made deliveries. Very few new contracts for the sale of uranium were entered into in 1968 by Canadian producers, and none of these was substantial or long-term. The total amount of uranium now committed for delivery by Canadian producers between 1969 and 1983 totals 80,000,000 pounds of  $U_3O_8$ .

### *Uranium Demand and Supply*

The quantities of uranium needed in the middle

and late nineteen-seventies are now greater than previously forecast. However, slippage in the completion dates of some of the reactors scheduled to be on line in 1968-69 has slightly reduced the short-term requirement for uranium fuel.

In spite of the tremendous increase in exploration activity in the United States, a modest increase in Canada, and a general reviving interest in other parts of the world, no substantial tonnage was added to Western world reserves that could be profitably mined and processed at today's prevailing prices. It is rather interesting to note that in 1968 exploration and development drilling in the United States totalled close to 24 million feet, a little over twice that of 1967, when drilling amounted to 10.7 million feet and exceeded all previous years. This tremendous increase in drilling activity had the net effect of adding only 13,000 tons of  $U_3O_8$  to the United States proven reserve, an increase which is relatively insignificant when considered in relation to the total Western world reserve of 600,000-700,000 tons.



W. M. Gilchrist

The estimated Western world requirement between now and 1980 is 500,000 tons of  $U_3O_8$ , but in this period physical limitations dictate that only some 400,000 tons could be mined from the reserve tonnage mentioned. For instance, Canada has 200,000 tons of the Western world reserves, but in the next decade little more than half of



this tonnage can be produced from the ore-bodies that constitute our reserve. Therefore, additional sources of supply must be found to meet even the needs of the nineteen-seventies which, although substantial, are small in relation to the needs of the two decades following 1980.

#### *Nuclear Power*

Some comment should be made concerning the problems with which the development of nuclear power is currently faced, and which seem to be giving rise to some apprehension as to the future of this new source of energy. There have been some delays in the planned start-up dates of the first reactors, due in part to construction and manufacturing problems peculiar to nuclear power plants. In some cases the delays have been close to a year, but the principal manufacturers are now stating that these problems have been overcome and will no longer be a matter of concern. There are also signs that the log jam of approval for construction and operating licensing that has caused so much loss of time in the United States is beginning to disappear. Pollution due largely to a rise in temperature of streams and lakes being used for the disposal of cooling water is also causing some alarm.

That there should be such problems, and that solving them will take time, should not be surprising. But even a very superficial examination would indicate that the expanding need for electrical energy, and the characteristics of nuclear power that make it so attractive, will demand that acceptable answers to these questions be found as quickly as possible.

The dramatic surge in the placing of orders for nuclear reactors in the United States that began in 1966 has slackened for the time being, as expected. However, a somewhat similar surge appears to be starting in Japan, and off-shore reactor commitments in 1969 may well exceed those of the United States. There is therefore no evidence to suggest that the current estimate of 300,000 megawatts of nuclear power in the Western world by 1980 is unduly optimistic.

Utility management would be well advised to make certain that it is assured of an adequate supply of fuel for a major part of the life of each reactor that it builds, since demand for uranium will increase at an average of 21% per annum between now and 1980, the fastest sustained growth ever experienced for any metal in the experience

of the mining industry. It would be well to remember that for the first time in history, man is looking to a metal as a major source of energy, and the same basic principles of economics that now apply to the fossil-fuel industries will have to be brought into play when dealing with the production of nuclear fuel.

#### *Comments on Eldorado Operations*

The pattern of substantially lower profits, first evidenced in 1966 with the significant reduction in selling prices for uranium, was continued in 1968 and was further influenced by the predicted lack of sales volume. However, as a result of higher interest rates earned on a temporary surplus of funds invested during part of the year, an operating loss of \$947,881 was more than offset, and a net income of \$178,860 for the year was earned.

It will be recalled that the Company's long-term objective has been to maintain the mining operation in a state of readiness to take full advantage of uranium markets when they develop, to improve its milling procedures, and to maintain its worldwide market contacts. All of these objectives were vigorously pursued during the year under review. Moreover, the programs designed to attract, train and retain a competent workforce of adequate numbers, were continued. However, the expenditure required to carry out these objectives, in the face of substantially reduced sales, has naturally had an adverse effect upon financial operating results, as evidenced by the operating loss referred to earlier.

#### *Increased Ore Reserves*

During the year, after mining 626,615 tons of ore, a net increase of more than 300,000 tons was added to the ore reserve, which now stands at its highest point in the history of the mine. This reflects the accelerated drifting and drilling programs of the past few years, and is one manifestation of the long-term objectives referred to above.

#### *Major Projects at Refinery*

In last year's Annual Report, reference was made to the desirability of having a plant in Canada to produce uranium hexafluoride. As a result of studies done by your Company, construction of this plant is now under way at Port Hope, Ontario, and contracts have been made with off-shore customers for the custom refining of concentrates to



UF<sub>6</sub>, as well as for the sale of Eldorado-produced uranium in the form of UF<sub>6</sub>. The plant is scheduled for initial production in the second quarter of 1970.

The new Eldorado zirconium plant, which will make Canada independent of off-shore purchases of this essential metal for its nuclear power programs, was largely completed by year-end, and will be in full operation by April. These two new plants will result in the creation of some significant employment opportunities in the Port Hope area.

#### *Research*

The Research and Development Division of your Company continued the development and process control programs at the mine and the refinery, and directed considerable effort to new methods of improving uranium recovery from the very refractory ores which appear in certain parts of the Beaverlodge mine and which have been a factor in contributing to unsatisfactory overall recoveries. The volume of custom research work done by the Division in several fields not related to the uranium industry continued to grow.

#### *Large amounts of capital required*

In last year's Report, reference was made to the Company's forthcoming substantial cash requirements, and the need to borrow large amounts for capital expenditures and the financing of inventories. Two possibilities for reducing the volume of borrowing were mentioned. One was to try to arrange for prepayment of \$25,700,000 by the United Kingdom Atomic Energy Authority under provisions in the Company's contract with the Authority, and this arrangement was made. The other was to seek advance payments under new contracts for future deliveries, but success in this direction has been limited since no substantial contracts were made during the year. Unless long-term contracts with advance payments are made

during 1969, the Company will be required to borrow to a maximum of \$16,000,000.

Since 1944, the cash return by the Company to the Receiver-General of Canada in the form of dividends, redemption of shares, and income taxes now amounts to \$63,709,000. Some \$4,045,000 has been contributed to the revenues of the Province of Saskatchewan in the form of royalties, and the Company has supported municipalities by way of grants in lieu of property taxes to an amount of about \$4,500,000.

Eldorado Aviation Limited, the wholly-owned subsidiary, again provided air support to the Company's mining and exploration activities, and in serving the needs of the Company's other subsidiary, the Northern Transportation Company Limited.

Three members of the Board of Directors retired in 1968 — F. R. Hadley, J. E. Sydie and W. G. Thompson. Elected in their stead were Dr. Roger Blais, Mr. Marcel Bélanger and Mr. W. S. Kirkpatrick. Mr. H. E. Lake, formerly vice-president, mining and exploration, left the Company at mid-year. In the resulting re-organization of functions, Mr. A. R. Allen, formerly manager of the Beaverlodge operation, was appointed General Manager, Mining and Exploration.

The Board is happy to again acknowledge the loyalty and efforts of all employees during the year.

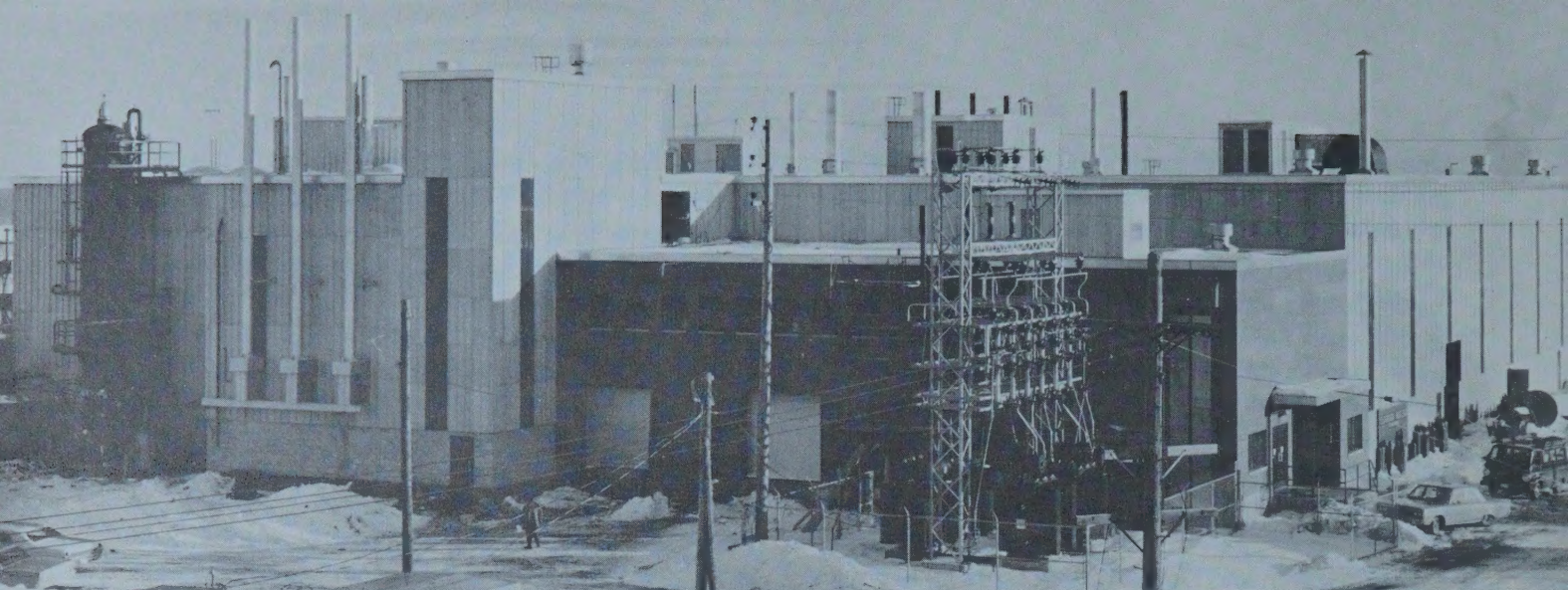
For the Directors,

*W. M. Gilsbunt*

*President*

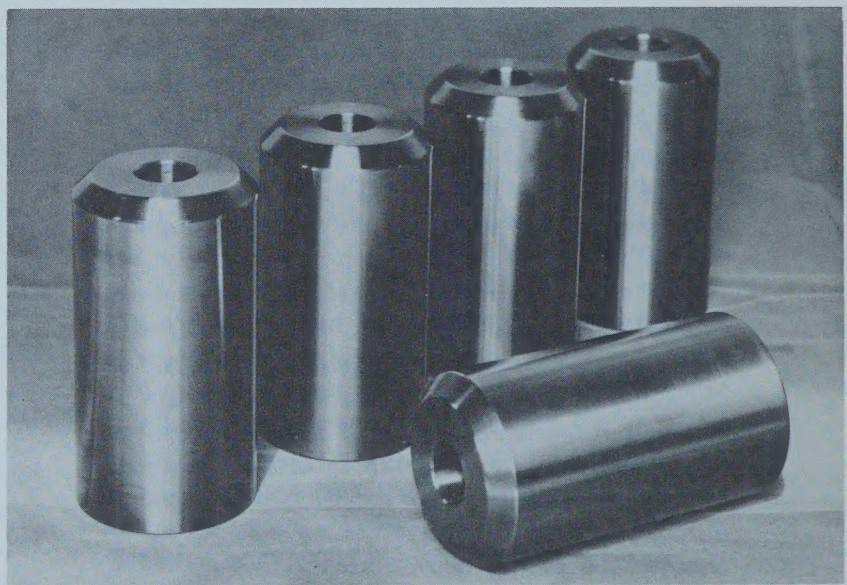
Ottawa, Canada  
February 26th, 1969



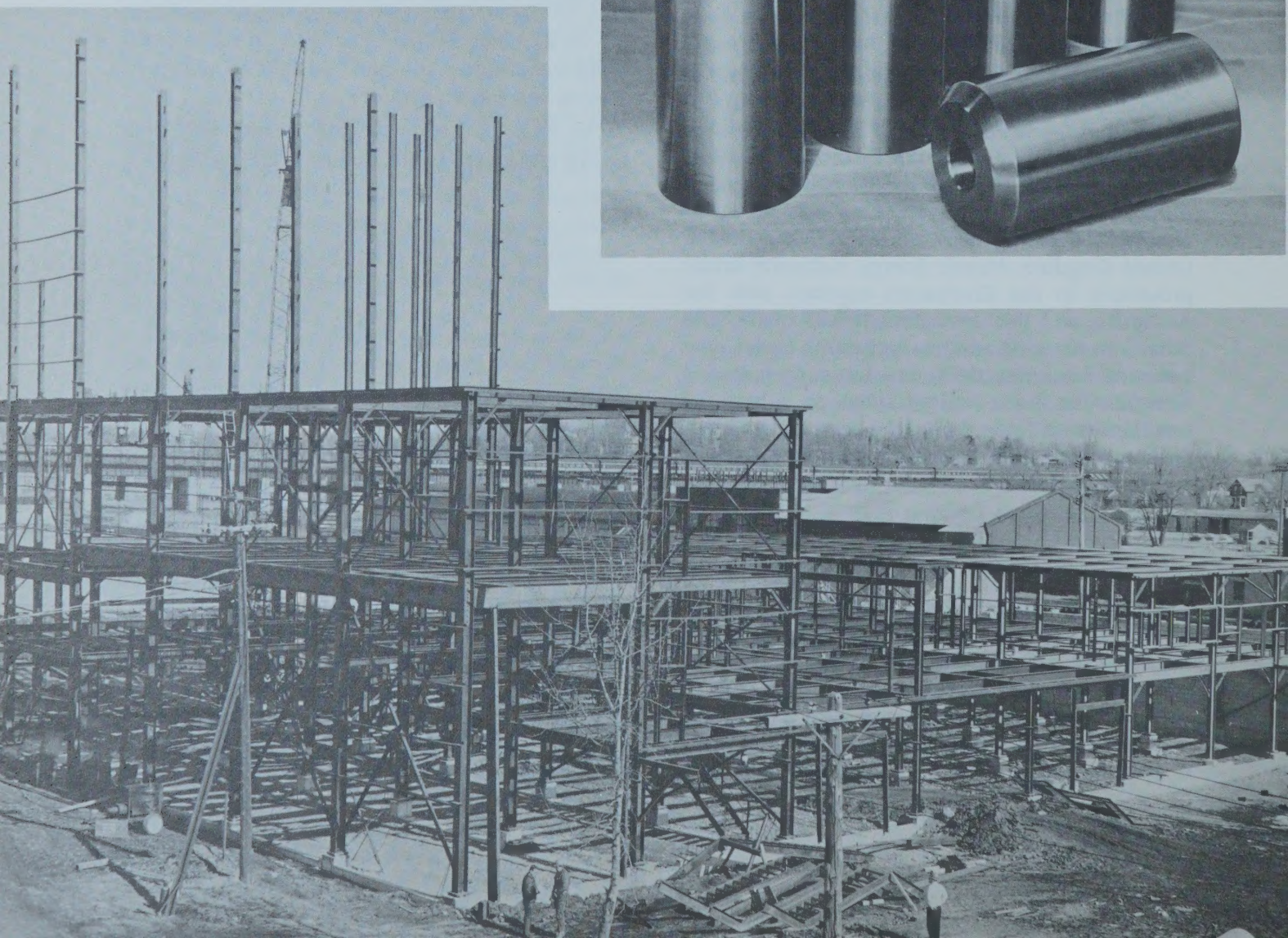


Top — The new zirconium plant

Center — Cored zircalloy-2 billets, ready for extrusion, produced by Eldorado's new process. About 4" x 8" weighing about 16 pounds each.



Bottom — The new UF<sub>6</sub> plant under construction





# ELDORADO NUCLEAR LIMITED

*and its wholly-owned subsidiary*

## ELDORADO AVIATION LIMITED

### GENERAL REPORT

*for the year ended December 31, 1968*

By Supplementary Letters Patent issued June 5, 1968 the Company's former name, Eldorado Mining and Refining Limited, was changed to Eldorado Nuclear Limited, reflecting the Company's expanding role in the commercial nuclear fuel business throughout the world.

This general report comments upon the operations of both Eldorado Nuclear Limited and its wholly-owned subsidiary Eldorado Aviation Limited, for the year ended December 31, 1968.

#### Income

Net income amounted to \$178,860, compared with \$269,548 in 1967. Sales revenue was very substantially lower than in the previous year. For the first time in the Company's history, income from sales was derived entirely from commercial rather than governmental contracts. Non-operating revenue increased by about 60% from the previous year, largely because of the higher interest rates prevailing during much of the year, and the availability of more funds for short term investment.

#### Taxes

As in 1967, no provision for income tax has been required, because of the effect of substantial capital cost allowances.

Grants in lieu of municipal taxes equal to current rates were again paid to those municipalities in which the Company has property. In 1968 a total of \$481,263 in such grants was paid to Uranium City, Saskatchewan, Edmonton, Alberta, Port Hope and Ottawa, Ontario.

#### Dividends

For the second consecutive year the Board has omitted payment of a dividend in order to conserve cash for the substantial capital expenditure

program which the Company has undertaken. Since 1944, the Company has paid to the Receiver General of Canada in dividends and by the redemption of shares a total of \$34,740,000.

#### Capital Expenditures

During 1968, capital expenditures recorded amounted to \$14,796,724 for new buildings, equipment and employee housing. Items of major importance were as follows: \$2,900,000 for the purchase from Cominco Limited of the Wellington Lake hydro electric power plant, which the Company had leased for a number of years; \$1,087,000 for 55 new rental housing units in Uranium City for mine employees; and \$1,837,200 for mine plant and equipment, including \$378,000 for the essential improvement of mine ventilation; at Port Hope \$6,436,870 for the new zirconium plant, \$669,519 for additional power plant, \$316,023 for an enlarged maintenance shop, \$300,230 for an expansion of laboratory facilities and \$788,154 as a preliminary expenditure on the new UF<sub>6</sub> plant now under construction.

For 1969, capital expenditures of \$11,200,000 have been planned. Included in this amount are \$6,550,000 for the UF<sub>6</sub> plant, \$1,000,000 for employee housing at Uranium City, and \$1,871,500 for mine and surface plant.

These capital expenditures, particularly for the zirconium and UF<sub>6</sub> plants, will make it necessary for the Company to borrow substantial sums during the next twelve to fifteen months.

#### Mining and Exploration Division

##### *Fay and Verna Mines*

From the Company's Fay and Verna mines, 2,001,648 pounds of U<sub>3</sub>O<sub>8</sub> were produced from



626,615 tons of ore, compared with 2,003,369 pounds of  $U_3O_8$  from 561,434 tons in 1967. Operating cost per pound of  $U_3O_8$  produced was 7.5% higher than in 1967, although the cost per ton mined was 3.7% lower than in the previous year. The higher cost per pound can be attributed in part to the grade of ore treated, which was the lowest in the history of the mine; and in part to those costs associated with a continued high labour turnover, to which detailed reference was made in last year's Report.

Comparative production statistics, not including custom ore treated, for the last 16 years are as follows:—

	<i>Tons of Ore Treated</i>	<i>Pounds of <math>U_3O_8</math> Recovered</i>	<i>Average Recovery Pounds Per Ton</i>
1968	626,615	2,001,648	3.19
1967	561,434	2,003,369	3.57
1966	511,446	1,687,501	3.30
1965	536,132	1,800,467	3.36
1964	522,148	1,837,029	3.52
1963	544,177	1,855,212	3.41
1962	563,580	1,959,788	3.48
1961	542,157	2,214,894	4.09
1960	625,127	2,454,400	3.93
1959	657,521	2,392,770	3.64
1958	676,354	2,507,663	3.71
1953-7	1,206,309	5,071,265	4.20
1953-68 inclusive	7,573,000	27,786,006	3.67

The continued aggressive development policy pursued in recent years has further increased ore reserves, which at the year end stood at 2,368,000 tons grading 0.21%  $U_3O_8$ , in the proven, probable and pillar categories. This represents an all-time high in ore reserves in the life of the mine, and does not include reserves in the new Hab mine. If ore in the "possible" category is included, reserves reach 3,551,000 tons grading 0.22%.

#### *The New Hab Mine*

The work necessary to prepare the Hab mine, seven miles distant from the Fay mine, was accomplished on schedule. The shaft sinking program attained excellent progress and was completed ahead of schedule with costs within the estimate. With some minor exceptions, all post-shaft-sinking installation work was completed by the year end, and lateral development and raising is now in progress. First production from this property is expected in early 1970.

#### *Exploration*

The restriction on outside exploration, which had been imposed upon the Company by government policy for some years, was lifted in mid-1968. As a consequence, activities have been extended to areas remote from the Beaverlodge complex, and plans for a number of projects are under way.

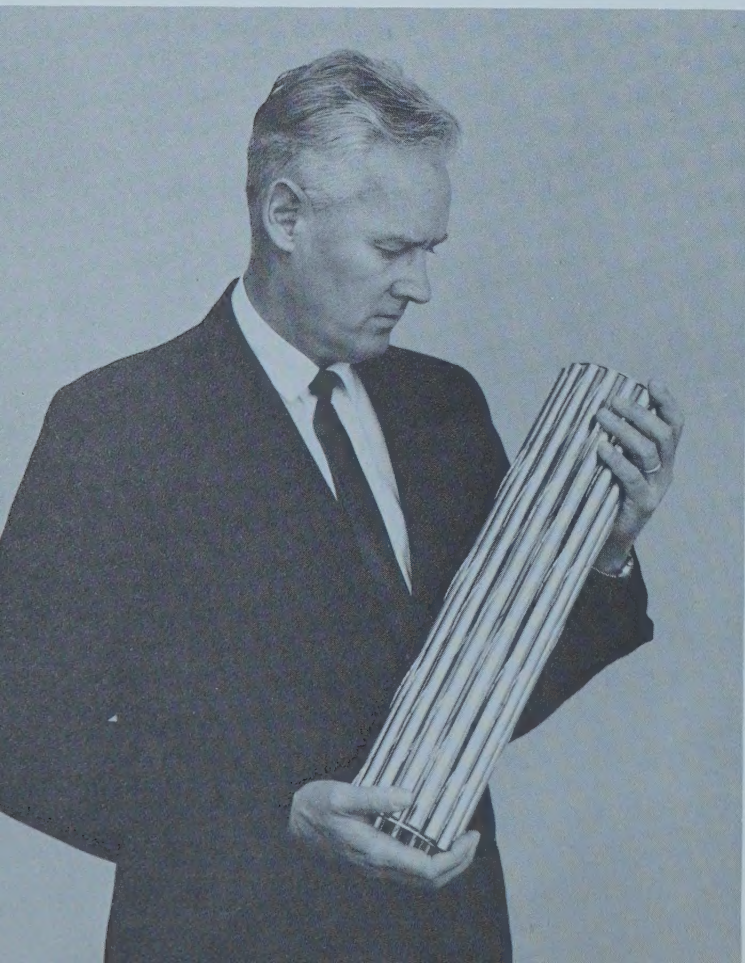
The exploration staff continued to appraise the several areas of interest in the Beaverlodge area, which had been acquired over a period of years. The basic objective of this work is to develop the necessary ore reserves from all possible local sources to maintain flexibility in operations and meet the economic and operational problems of long range continuity of operations. The assistance of the Government of Saskatchewan under its Mineral Exploration Incentive Program is acknowledged.

#### *The Port Hope Operation*

Refining of concentrates in the second government stockpile was completed in mid-November and, in accordance with plan, the uranium solvent extraction circuit was shut down. It will be re-opened in mid-1970, when its operation will again

*General Report Cont. on Page 16*

The  $UO_2$  powder used in pellets for this fast neutron fuel assembly was produced by Eldorado. Either natural or enriched  $UO_2$  may be used, or either may be blended with  $ThO_2$





ELDORADO NUCLEAR LIMITED

# Statement of Income and Expense

*for the year ended December 31, 1968*

*(with comparative figures for the year ended December 31, 1967)*

	1968	1967
<b>Income:</b>		
Sales — Company's products and services .....	\$ 1,451,279	\$ 14,555,823
<b>Expense:</b>		
Cost of products and services sold .....	1,116,737	13,323,674
Scientific research .....	590,230	682,895
Administration .....	380,393	402,664
Exploration .....	187,237	223,359
Selling and shipping .....	124,563	351,346
	<u>2,399,160</u>	<u>14,983,938</u>
Net loss from operations .....	947,881	428,115
Interest and other non-operating income (net) .....	<u>1,126,741</u>	<u>697,663</u>
<b>Net Income</b> .....	<u>\$ 178,860</u>	<u>\$ 269,548</u>

The accompanying notes are an integral part of the financial statements.



# Eldorado N

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	ASSETS	1968	1967
<b>Current Assets:</b>			
Cash .....	\$	338,454	\$ 584,935
Deposit with Receiver General .....		—	6,000,000
Treasury bills and short-term bank deposits .....		3,400,000	1,897,290
Accounts receivable .....		7,281,694	4,981,639
Advances in respect of concentrates to be received .....		—	13,412,500
Concentrates and refinery products valued at lower of cost or realizable value .....		18,634,801	4,989,668
Operating and general supplies, at cost .....		3,680,451	2,739,533
Prepaid expenses .....		358,064	118,753
		<u>33,693,464</u>	<u>34,724,318</u>
Deferred accounts receivable in respect of concentrates delivered (Note 1) .....		6,487,662	33,698,097
Advances in respect of concentrates to be received in later years .....		2,125,000	1,200,000
		<u>8,612,662</u>	<u>34,898,097</u>
<b>Investments and Loans:</b>			
Investments in wholly-owned subsidiary companies, at cost (Note 2) ..		187,153	187,153
Employees' housing loans .....		205,269	281,386
Municipal Corporation of Uranium City and District, 5% to 7 <sup>3</sup> / <sub>4</sub> % debentures, maturing 1975-85 .....		765,317	684,410
		<u>1,157,739</u>	<u>1,152,949</u>
<b>Unamortized Expense:</b>			
Pre-production and mine development costs .....		2,627,729	787,137
Excess of costs and expenses over sales of concentrates procured from other producers (Note 3) .....		1,835,938	—
		<u>4,463,667</u>	<u>787,137</u>
<b>Capital Assets:</b>			
Property, plant and equipment, at cost .....		62,878,496	48,463,832
Less: Accumulated depreciation .....		46,210,680	45,677,657
		<u>16,667,816</u>	<u>2,786,175</u>
		<u>\$ 64,595,348</u>	<u>\$ 74,348,676</u>

The accompanying notes are an integral part of the financial statements.  
Approved on behalf of the Board

W. M. GILCHRIST, *Director*  
MARCEL BÉLANGER, *Director*



# lear Limited

(Incorporated under the Canada Corporations Act)

## Balance Sheet

December 31, 1968

(as at December 31, 1967)

	LIABILITIES	1968	1967
<b>Current Liabilities:</b>			
Accounts payable .....	\$	3,325,210	\$ 4,590,898
Advance payments in respect of concentrates to be delivered .....		1,128,917	14,686,900
		<u>4,454,127</u>	<u>19,277,798</u>
Advance payments in respect of concentrates to be delivered in later years . .		<u>5,572,363</u>	<u>1,920,000</u>
Deferred accounts in respect of purchase and development programs .....		<u>2,357,750</u>	
Excess of sales over costs and expenses of concentrates procured from other producers (Note 3) .....		—	<u>1,118,630</u>
<b>Capital:</b>			
Capital Stock:			
Authorized — 110,000 shares of no par value			
Issued — 70,500 shares, fully paid .....		6,586,080	6,586,080
Surplus .....		45,625,028	45,446,168
		<u>52,211,108</u>	<u>52,032,248</u>
		<u>\$ 64,595,348</u>	<u>\$ 74,348,676</u>

I have examined the above Balance Sheet and the related Statement of Income and Expense and have reported thereon under date of February 26, 1969 to the Minister of Energy, Mines and Resources.

A. M. HENDERSON,  
Auditor General of Canada



# Eldorado Nuclear Limited

## Notes to Financial Statements

### 1. Deferred Accounts Receivable

The balance in this account at December 31, 1968 is receivable under contracts which provide for payment to be made following shipment of products as required from time to time before 1975. During the year, the deferred account with the United Kingdom Atomic Energy Authority which amounted to \$25,718,945 at December 31, 1967 was eliminated through arrangements for early liquidation as provided for in the original contract with the Authority.

### 2. Subsidiary Companies

The assets, liabilities, income and expense of the Company's two wholly-owned subsidiaries, Eldorado Aviation Limited and Northern Transportation Company Limited have not been included in the financial statements of Eldorado Nuclear Limited.

The net expenses of Eldorado Aviation Limited are recovered from Eldorado Nuclear Limited and Northern Transportation Company Limited. The aggregate undistributed profits of Northern Transportation Company Limited as at December 31, 1968 amounted to \$7,104,995.

All three companies are Crown corporations as defined by section 76(c) of the Financial Administration Act, and as such each is required to report annually to the appropriate Minister in compliance with the provisions of that Act.

### 3. Excess of Costs and Expenses over Sales of Concentrates procured from other Producers

At December 31, 1967 the excess of sales over costs and expenses of concentrates procured from other producers amounted to \$1,118,630. During the year a discount of \$3,185,974 was incurred in the early liquidation referred to in Note 1. A partial amortization of the above items resulted in a balance of \$1,835,938 at December 31, 1968. This balance will be amortized over the remaining deliveries of concentrates to be made to the United Kingdom Atomic Energy Authority.

### 4. Depreciation

Provision for depreciation during the year amounted to \$845,927.

### 5. Government of Canada Stockpile Program

The Treasury Board, with the approval of the Governor in Council, has granted authority for Eldorado Nuclear Limited to purchase and stockpile uranium bearing concentrates for the Government of Canada. At December 31, 1968 the Company was the custodian of concentrates thus acquired at a cost of \$82,413,897. The cost of these concentrates, being chargeable to parliamentary appropriations, is therefore not included in the accounts of the Company.

### 6. Remuneration of Directors

Total remuneration of directors as directors, officers or employees of the Company for the year was \$36,000.

ELDORADO NUCLEAR LIMITED

# Statement of Sales and Costs of Uranium Concentrates procured from other Producers

for the year ended December 31, 1968

Sales of concentrates .....	\$ 22,491,020
Cost of concentrates sold .....	22,257,789
	<hr/>
	233,231
Amortization of excess of costs and expenses over sales of concentrates procured from other producers (Note 3) .....	231,406
	<hr/>
Net income to Company operations .....	\$ 1,825
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The accompanying notes are an integral part of the financial statements.

ELDORADO NUCLEAR LIMITED

# Statement of Surplus

for the year ended December 31, 1968

(with comparative figures for the year ended December 31, 1967)

	1968	1967
Balance at January 1 .....	\$ 45,446,168	\$ 45,176,620
Net profit for year .....	178,860	269,548
	<hr/>	<hr/>
Balance at December 31 .....	\$ 45,625,028	\$ 45,446,168
	<hr/> <hr/>	<hr/> <hr/>

The accompanying notes are an integral part of the financial statements.

## AUDITOR GENERAL OF CANADA

Ottawa, February 26, 1969.

The Honourable J. J. Greene,  
Minister of Energy, Mines and  
Resources, Ottawa.

Sir,

I have examined the accounts and financial statements of Eldorado Nuclear Limited for the year ended December 31, 1968. In compliance with the requirements of section 87 of the Financial Administration Act, I report that, in my opinion:

- (a) proper books of account have been kept by the Company;
- (b) the financial statements of the Company
  - (i) were prepared on a basis consistent with that of the preceding year and are in agreement with the books of account,
  - (ii) in the case of the balance sheet, give a true and fair view of the state of the Company's affairs as at the end of the financial year, and
  - (iii) in the case of the statement of income and expense, give a true and fair view of the income and expense of the Company for the financial year; and
- (c) the transactions of the Company that have come under my notice have been within the powers of the Company under the Financial Administration Act and any other Act applicable to the Company.

Yours faithfully,

A. M. HENDERSON.

Auditor General of Canada.



# ELDORADO AVIATION LIMITED

(Incorporated under the Canada Corporations Act)

## Balance Sheet

at December 31, 1968

(with comparative figures at December 31, 1967)

### ASSETS

	1968	1967
<b>Current Assets:</b>		
Cash .....	\$ 68,270	\$ 47,626
Accounts receivable:		
Eldorado Nuclear Limited .....	2,714	20,245
Northern Transportation Company Limited .....	16,410	—
Other .....	16,923	13,149
	<u>36,047</u>	<u>33,394</u>
Operating supplies, at cost .....	56,206	62,074
Prepaid insurance .....	27,755	29,708
Total Current Assets .....	<u>188,278</u>	<u>172,802</u>
<b>Capital Assets, at cost:</b>		
Aircraft, including major spare parts .....	997,257	987,321
Shop, hangar, and loading equipment, etc. ....	45,765	40,704
Office furniture and equipment .....	9,752	9,049
	<u>1,052,774</u>	<u>1,037,074</u>
Less: Accumulated depreciation .....	935,089	893,548
	<u>117,685</u>	<u>143,526</u>
	<u>\$ 305,963</u>	<u>\$ 316,328</u>

### LIABILITIES

	1968	1967
<b>Current Liabilities:</b>		
Accounts payable .....	\$ 23,566	\$ 33,931
	<u>23,566</u>	<u>33,931</u>
<b>Capital</b>		
<b>Capital Stock:</b>		
Authorized — 50,000 shares of \$1 each		
Issued — 28,006 shares, fully paid .	28,006	28,006
Surplus .....	254,391	254,391
	<u>282,397</u>	<u>282,397</u>
	<u>\$ 305,963</u>	<u>\$ 316,328</u>

Approved on behalf of the Board

R. C. POWELL, *Director*

W. M. GILCHRIST, *Director*

I have examined the above Balance Sheet and the related Statement of Recoverable Expense and have reported thereon under date of March 7, 1969 to the Minister of Energy, Mines and Resources.

A. M. HENDERSON,  
*Auditor General of Canada*



## ELDORADO AVIATION LIMITED

### Statement of Recoverable Expense

for the year ended December 31, 1968

(with comparative figures for the year ended December 31, 1967)

	1968	1967
Salaries and wages .....	\$ 265,308	\$ 238,312
Supplies .....	187,804	180,779
Repairs .....	167,602	124,136
Hangar expense .....	103,101	54,942
Depreciation .....	44,714	29,867
Employee benefits .....	38,168	27,965
Insurance .....	29,924	25,710
Landing fees .....	17,821	15,862
Travel .....	1,819	2,524
Miscellaneous .....	17,492	5,279
	<u>873,753</u>	<u>705,376</u>
Miscellaneous income .....	88,480	37,227
	<u>785,273</u>	<u>668,149</u>
Net Expense .....	<u>\$ 785,273</u>	<u>\$ 668,149</u>

Note: The above net expense was recovered from:

Eldorado Nuclear Limited .....	\$ 659,263	\$ 544,359
Northern Transportation Company Limited .....	126,010	123,790
	<u>\$ 785,273</u>	<u>\$ 668,149</u>

## AUDITOR GENERAL OF CANADA

Ottawa, March 7, 1969.

The Honourable J. J. Greene,  
Minister of Energy, Mines and  
Resources, Ottawa.

Sir,

I have examined the accounts and financial statements of Eldorado Aviation Limited for the year ended December 31, 1968. In compliance with the requirements of section 87 of the Financial Administration Act, I report that, in my opinion:

- (a) proper books of account have been kept by the Company;
- (b) the financial statements of the Company
  - (i) were prepared on a basis consistent with that of the preceding year and are in agreement with the books of account,
  - (ii) in the case of the balance sheet, give a true and fair view of the state of the Company's affairs as at the end of the financial year, and
  - (iii) in the case of the statement of recoverable expense, give a true and fair view of the expense of the Company for the financial year; and
- (c) the transactions of the Company that have come under my notice have been within the powers of the Company under the Financial Administration Act and any other Act applicable to the Company.

Yours faithfully,

A. M. HENDERSON.

Auditor General of Canada.

be necessary to provide basic feed to the  $\text{UO}_2$  and  $\text{UF}_6$  production lines. As a part of this re-scheduling, sufficient ammonium diuranate has been stockpiled to permit the continued production of  $\text{UO}_2$  natural ceramic oxide powder until mid-1970.

Production of  $\text{UO}_2$  powder increased by 250% in 1968, and shipments were three times those of 1967. To meet this growing demand, operation of a continuous rotary reduction furnace was begun late in the year.

As referred to under the heading "Capital Expenditures", a very substantial construction program was carried out during the year and was continuing at the year end as the  $\text{UF}_6$  plant began to take shape.

In order to cope with zirconium production requirement, the Refinery work-force was increased by 57% during the year. An extensive training program, contributed to by the Ontario Department of Labour and the Canada Department of Manpower and Immigration, was commenced late in the year to train personnel for zirconium operations.

In the metallurgical and casting areas operations were widely diversified, producing a range of alloys from natural, depleted and enriched uranium metal. The facilities for this work were improved by the addition of a Degussa arc melting furnace.

### Sales and Promotion

Two contracts for the sale of uranium in the form of  $\text{UF}_6$  were signed during the year. A West German utility entered into a contract covering its replacement needs until 1975 and a Swedish utility purchased its requirements for a two-year period. Two large contracts involving the sale of yellowcake, signed in 1967, were re-negotiated for conversion of the yellowcake to  $\text{UF}_6$ . One of these contracts has been signed and the other is ready for signing in February of 1969. In accordance with government policy, all sales of uranium for export are made subject to the applicable nuclear safeguards provisions.

A contract for the conversion of yellowcake to uranium dioxide ( $\text{UO}_2$ ) has been consummated with Canadian Westinghouse for the Gentilly Nuclear Power Station in the Province of Quebec.

Orders have already been negotiated for a significant portion of the first year's production, and contacts are being pursued towards further export sales.

At year-end, a number of proposed contracts were under consideration by utilities in Europe and Japan, and the United States, for uranium as  $\text{U}_3\text{O}_8$  concentrates or as  $\text{UF}_6$ , or for conversion services to produce  $\text{UF}_6$  from the customer's uranium. Similar discussions were in progress with other Canadian uranium producers looking to Eldorado's  $\text{UF}_6$  conversion service.

### Research and Development

The zirconium program constituted the principal effort of the Research and Development Division in 1968. Specifically, major efforts were directed toward the development of processes for the treatment of effluent streams and the preparation of the metallic reductant in a suitable form for reaction.

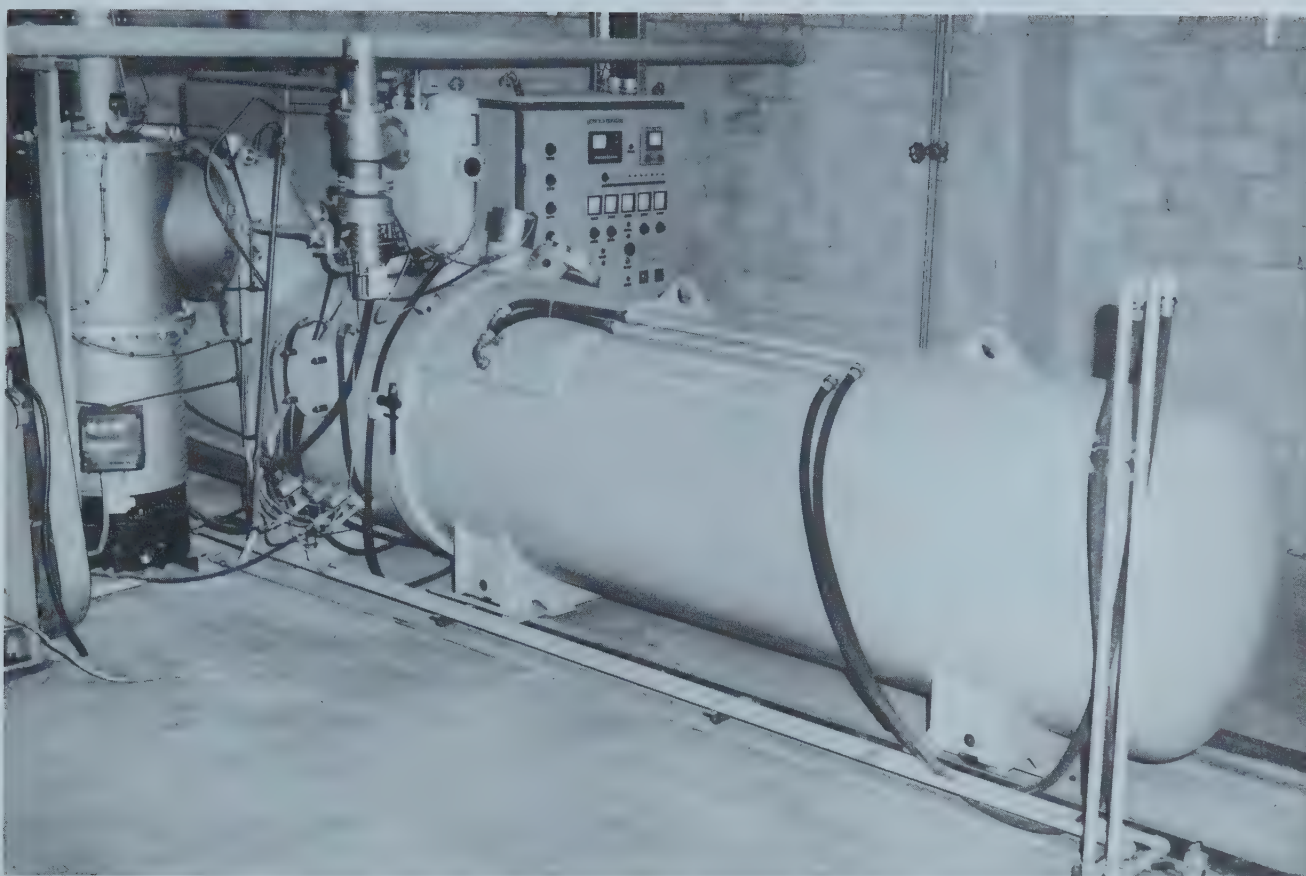
Extensive testwork on methods of improving uranium recovery from refractory ore in the Fay mine was carried out in 1968. A split flowsheet, incorporating flotation, acid and alkaline leaching and solvent extraction, was investigated at the laboratory and pilot plant scale. Preliminary capital and operating cost estimates were prepared for full-scale commercial operation. An alternative process, low pressure alkaline leaching, is currently under investigation and appears promising for the treatment of the more refractory type of ores.

The Research and Development Division also investigated a number of areas in the refined uranium products field, particularly those related to continuous processing to  $\text{UO}_3$  and the production of  $\text{UF}_6$ .

As predicted in last year's Report, the volume of research and development work done for outside firms increased in 1968. These projects were primarily concerned with the recovery of uranium from ores and concentrates, but included several investigations pertaining to the recovery of other metals or minerals. The application of the Division's technology in solvent extraction to elements other than uranium presents a fertile area for custom contracts, and Eldorado's well-equipped laboratory and highly-skilled technical staff stands ready to assist industry in this special field.

The level of Company-sponsored research at





Electron beam welder for the welding of zirconium billets

Canadian universities was reduced slightly in 1968 to bring these expenditures into a better relationship with the overall Company research cost. At present, contracts are in force with two universities.

### Uranium Procurement

This section of the Report deals with Eldorado's function as administrator of contracts between the Canadian government and other Canadian uranium producers.

At the present time, contracts exist between the Canadian government and four uranium mines in Canada, including Eldorado, for deliveries to the second government stockpiling program announced by the government in June, 1965. The total permissible deliveries in 1968 were 5,827,809 pounds of  $U_3O_8$ , but largely because of economic considerations rather than production difficulties, only some 38% of this quantity was delivered. The government's investment in stockpiled uranium in mine concentrates now stands at approximately eighty-one million dollars, an increase of eleven million dollars during 1968.

Of the original deliveries of Canadian uranium to the United Kingdom Atomic Energy Authority under the 12,000-ton contract of 1962, only about 3,300 tons remain to be delivered, by Rio Algom Mines Ltd., ending in 1971.

### Activity in Industry Increases

Although the rate of nuclear power plant commitments in the Western world was lower in 1968 than that of the previous two years, the uranium mining industry substantially increased both its production and its exploration activity. During the year it became apparent that the decreasing trend in world uranium output had been arrested — although this trend had already been reversed in Canada in 1967.

Western world production of some 24,000 tons  $U_3O_8$  was 6,000 tons greater than in 1967. None of this increase is attributable to Canada, although Canadian producers and potential producers were active in 1968 in gearing their mine operations for increased output in the near future. Moreover, sixty-four new uranium exploration permits were

issued in 1968, reflecting the increasing interest of the mining community in uranium's potential.

Contrary to the mining industry's expectations, and despite warnings of an impending crisis in uranium supply, no substantial long-term contracts (i.e., into the 1980's) were negotiated by the utility companies with Canadian producers during 1968. Exclusive of government stockpiling, the Canadian uranium industry is now committed to deliver, largely for export, approximately 40,000 tons of  $U_3O_8$  between 1969 and 1983.

## Organization and Manpower

December 31, 1968 was the first year-end since 1960 at which the Company's work force exceeded a total of one thousand persons.

The composition and distribution of employees at the year-end compared with a year earlier was as follows:—

	Hourly- rated employees	Salaried employees	Totals	
			1968	1967
Beaverlodge Operation	525	212	737	679
Port Hope Operation — Refining, Sales and Technical Services	172	84	256	159
Research & Development	3	46	49	50
Edmonton Office	—	8	8	9
Head Office	—	26	26	26
	700	376	1,076	923

The net increase of 153 employees for the year arose primarily out of the requirement for additional production and technical personnel at the

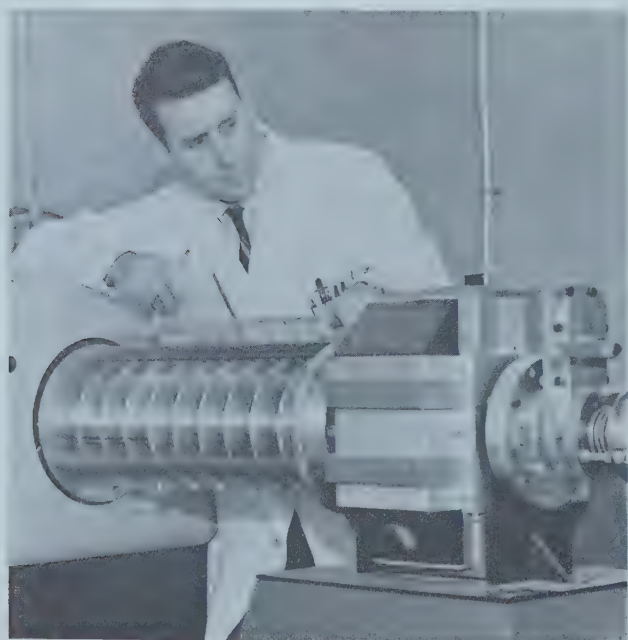
Port Hope Refinery where zirconium operations were phased-in near the year-end. All of the newly hired hourly-rated employees are residents of Port Hope and environs; a sizeable percentage were formerly employed by a major manufacturing company whose local operations were shut down in the summer of 1968. At the mine, the net increase of 58 employees was prompted by the commencement of underground development of the Hab mine and by the need for expanded services, notably the Company's opening of a groceteria in Uranium City to serve employees and their families.

Personnel turnover at the mine continued to be high, averaging 5% per month. The detailed statistics point up the following pattern: employees with service of less than six months, living single status in camp, turn over at two to three hundred per cent per year; married employees in Company houses turn over at less than ten per cent per year; others at about fifty per cent.

Under the Company's rental housing program in Uranium City, 55 units were added during the year and in 1969 a further 50 units will be built, bringing the number of units under the Company's rental program to a total of 173 and the Company's investment in rental housing to approximately \$3 million. In keeping with the policies established in prior years, various induction and a combination of vestibule and on-the-job training courses were conducted throughout the year.

During the first part of the year all professional and supervisory personnel at the Mining and Exploration Division participated in an in-plant course "Basic Principles of Supervisory Management". Later in the year the course was extended successfully to the Refinery and in 1969 it is planned that it be offered also at the Research and Development Division in Ottawa and to supervisors of the Company's two subsidiaries in Edmonton.

Wages and salaries paid by the Company in 1968 amounted to \$8,262,109, up 14% from the total of \$7,255,749 in 1967. The Company's contribution to the pension, employee group insurance and medical insurance plans increased in total to \$497,250 from \$482,946 in 1967.



Neutron generator for activation analysis of trace elements in metals





Beaverlodge Mine and Townsite

At year end 1,274 employees of the Company and its two subsidiaries were active members of the Eldorado Pension Plan (1959) and a total of 136 persons, including 34 widows and 28 children, were being paid benefits at the rate of \$118,319 per annum. In addition, 35 former employees were entitled to fully vested deferred yearly pensions totalling \$46,982.

A new 2-year Collective Bargaining Agreement, covering laboratory technicians of the Research and Development Division in Ottawa, was entered into with the Public Service Alliance of Canada effective June 1, 1968. Contract renewal discussions with the United Steelworkers of America, representing hourly-rated employees of the Mining and Exploration Division, were begun in August and referred to the Officer Stage of Conciliation late in September. An agreement was reached in late February for a 2-year contract ending in February 1971, replacing the contract which expired August 31, 1968.

### Eldorado Aviation Limited

Operating under a Class 5 licence from the Canadian Transport Commission, this wholly-owned subsidiary provides air service, by contract, and at cost, to the parent company and to Northern Transportation Co., Ltd. The Company is not a common carrier. Equipment consists of a DC-4, two DC-3's, three Bell helicopters, and one 7-

passenger S-55 helicopter. The DC-4 operates as a "main-line" aircraft between Edmonton and the Beaverlodge mine. One DC-3 is used primarily in the summer months to serve the needs of the agencies of Northern Transportation Co., Ltd., throughout the Mackenzie River valley and the Western Arctic. The Bell helicopters are used in servicing hydro lines and plants in the Beaverlodge mine area, ice reconnaissance in the Arctic, and exploration activities. The S-55 helicopter is also employed mainly for exploration purposes.

During 1968, the Company's second DC-3 was dry-leased and earned revenue of some \$67,000.

Mileage flown by the fixed wing aircraft was only marginally greater than in the previous year, but ton-mileage increased by 8.2%. The cost per ton mile was up to 21.19¢ from 19.36¢ in 1967, reflecting the higher operating costs common to the industry and forecast in last year's Report.

Since the beginning of operations in 1944, the Company's transport aircraft have flown 15,088,000 miles, have operated about 78,000 hours, and have carried approximately 94,500 tons of freight and almost 143,000 passengers, at an average per-ton mile cost of less than 21 cents.

At the end of 1968, the staff numbered 34, including two part-time employees. Salaries and wages were \$326,106, while the value of Company contributions to group insurance and pension plan was \$34,401.

# Eldorado's Role in the Canadian Uranium Story

*Twenty-five years ago the concept of generation of electricity from nuclear sources was still regarded generally as belonging to the realm of science fiction. Today many nuclear reactors are producing and more are coming into existence so rapidly that the Western world will be hard-pressed to supply enough of the vital fuel, uranium. Canada is a major source. Since 1954 alone, uranium has brought more than \$1,780,000,000 into the Canadian economy, and about one dollar in every five has been generated by Eldorado.*

Prior to World War II it is probable that not more than one of every 50,000 people in the world had even heard of uranium. Even in scientific circles it was still looked upon as an element of minor interest and with limited possibilities. There was so little demand for it that there was virtually no market, even at prices of \$1.50 to \$2.00 per pound that were well below the cost of production. The advent of the nuclear age has changed all that, and there is growing awareness that within the next decade or so uranium will be in short supply.

The threat of a critical shortage seems paradoxical in face of the fact that the element uranium is known to occur under such a variety of geological conditions that it could probably be found in small quantities in almost any part of the world. Igneous rocks constitute 90 per cent of the Earth's crust, and all such rocks contain at least traces of uranium and its cousin element, thorium. Minute quantities are found in all the world's rivers and seas. Geologically, uranium is less abundant than copper, nickel or zinc, but more abundant than gold or silver.

This abundance is, of course, a relative thing. The fact that uranium exists in trace amounts in rock and sand and sea does not mean that vast quantities can be extracted for man's use. A deposit containing one-tenth of one per cent uranium oxide represents a concentration about 300 times the average abundance in the Earth's crust. By far the greater part of Canada's ore reserves — which are equal to more than one-third the total known reserves of the Western world — average only 0.1 per cent uranium oxide.

Generally speaking, the geology of Canada is favorable to the discovery of large and relatively rich deposits of uranium, if enough time, money and technical knowledge are applied to the search. Unlike gold, for example, which is discovered in the form of veins, threads, layers, nuggets and granules, uranium is never found in nature in the metallic state, but always occurs in combination with oxygen as oxides or silicates. The refined metal is white on fresh fracture, but takes on a bronze-like tarnish upon exposure to air. It is not quite as hard as steel, but has a density about two and one-half times that of

steel. Its most outstanding physical characteristic is its radioactivity.

## *The Discovery of Radium*

A German chemist, Klaproth, experimented with some unusual black ore that came from a mine at Joachimsthal in Bohemia, and discovered the element uranium in 1789. It remained a mere laboratory curiosity for more than a century. In 1896 Henri Becquerel learned by sheer chance that pitchblende emitted radiation not unlike the x-rays discovered by Röntgen. His published observations set the Curies on the path to an important scientific achievement.

The Curies discovered radium and its transformation product, polonium. They demonstrated that radium exists in all naturally-occurring uranium in the ratio of about one part in 3,000,000, and accounts for its radioactivity.

After it became known that radium would have important applications in the treatment of diseases, particularly tumors and cancers, as well as a number of uses in industry, demand created a fantastic value for the few grains — not grams — that could be derived annually from the only known source, the primitive mine in Bohemia. A quarter-gram was worth \$50,000. When mines were developed in the United States, about 1912, radium became more readily available and the price came down to about \$125,000 a gram, or \$3,500,000 per ounce. Early in the 1920's a Belgian syndicate developed a mine in the Congo, and with substantial quantities of ore and new and better methods of refining it was able to stifle U.S. competition and enjoy a virtual monopoly at a price of about \$70,000 a gram. This continued until the mid-1930's when Canada became a major producer of radium.

## *The Mine that Broke the Monopoly*

In the late 1920's Gilbert Labine of Eldorado Gold Mines Limited undertook aerial prospecting in the Far North, and was rewarded with the finding not only of silver and cobalt along the eastern shore of Great Bear Lake, but of substantial quantities of pitchblende. Claims were staked and development of the mine was begun as quickly as equipment could be brought in, virtually all of it by air-lift in the small aircraft available at the time. Initial operations were directed mainly towards the silver, cobalt and gold values in the ore, but it soon became apparent the real wealth of the mine lay in the pitchblende.

A small refinery was established at Port Hope, Ontario almost 3,000 miles from the mine itself. Shipping of concentrates by air, water and rail began in 1932. The refinery made its first delivery of Canadian-



produced radium in 1933. In November, 1936, it completed production of its first ounce (28 grams) of radium, and by 1938 a monthly output of 2.5 grams was reported. The actual product of the refinery was radium bromide of 90 per cent purity, which was sent to England for accurate determination of radio-active content, final refinement, and preparation into usable form.

Even though the amounts involved seem relatively minute, the rising Canadian production broke the Belgian monopoly and the price of radium dropped rapidly. In 1940 demand had diminished, substantial inventories were on hand, labor was scarce, so Eldorado closed the Port Radium mine.

Concurrent with the production of radium through the 1930's Eldorado had sold significant quantities of silver from the mine and had developed a small market for such uranium salts as yellow and orange sodium uranate and black oxide, mainly for use in the coloring of glass and ceramics. The price of these salts ranged from \$2.50 to \$2.92 per pound in 1938.

### *Eldorado Becomes a Crown Company*

An urgent need for uranium in quantity arose with the inception in 1942 of the Manhattan Project, the joint British-United States-Canadian undertaking which eventually brought forth the atomic bomb. Canada's role was to supply the uranium raw material, and the Government requested the re-opening of the Port Radium mine on an emergent basis, but gave no hint as to the reason. The mine and mill, as well as the Port Hope refinery, were in full operation by late 1942. Shipments of uranium were made, but it is believed the actual material used for the first atomic bomb was not of Canadian origin.

Late in 1943, when it became evident that the atomic bomb would be feasible, the three governments concerned decided that they should at once gain complete control of uranium resources within their respective territories. On January 28, 1944, Eldorado was expropriated and the operation was taken over by the Crown-owned Eldorado Mining and Refining (1944) Limited. Northern Transportation Company Limited, a wholly-owned subsidiary of Eldorado, was one of the assets acquired.

### *The Canadian Uranium Boom*

While the ore of the Port Radium mine was exceed-

ingly rich in uranium content, the deposit eventually gave out and the mine was closed down in September, 1960. In the meantime, in the late 1940's, Eldorado prospectors had found important deposits in the Lake Athabasca region, leading to development of the Beaverlodge mine which went into production in 1953. Eldorado continued to be Canada's sole producer of uranium until cold war demands created new and urgent demands which led to the discovery and development of other major deposits, especially in the Blind River and Bancroft areas of Ontario and the Beaverlodge region of Northwestern Saskatchewan. By 1958 there were 25 producing mines in Canada, and the peak output of almost 31,000,000 pounds of uranium oxide was attained the following year.

The amount of uranium provided by Eldorado for military purposes during World War II and up to 1954 is still classified information. However, the Company's revenue from 1944 to the end of 1954, from the sale of uranium and from some sales and rentals of radium, was about \$82,000,000. Its income from uranium sales in the period 1955-67 inclusive was \$288,210,605, and in the same term its revenue from operation of the refinery amounted to \$40,133,069.

From its original investment of \$9,246,877 in acquiring ownership of Eldorado, the Canadian Government has derived a return of \$34,740,000 in dividends and redemption of shares. From 1944 to the end of 1968 the Company has paid Federal taxes, provincial royalties, and grants in lieu of municipal taxes, amounting to a total of \$37,514,000. The net worth of the Company at the end of 1968 was \$52,200,000.

### *History of Eldorado Aviation*

The remoteness of the Port Radium mine made air transportation essential from the beginning. In 1944 Eldorado bought its own aircraft to assist in field exploration work and the movement of personnel, perishable goods, and emergency supplies. The service was expanded and a regular schedule instituted with the inception of the Beaverlodge mine, and in 1953 the Aviation Division was incorporated as a wholly-owned subsidiary, Eldorado Aviation Limited. It provides air service at cost for Eldorado and Northern Transportation Company Limited.

The Company's transport aircraft have flown 15,088,000 miles and carried approximately 94,500 tons of freight and 143,000 passengers.





AR79

NEWS RELEASE BY  
Eldorado Mining and Refining Limited  
Suite 800, 151 Slater Street,  
Ottawa, Canada

FOR RELEASE AFTER 8.00 A.M. EST

THURSDAY, APRIL 11, 1968

OTTAWA, -- The president of the Crown-owned Eldorado Mining and Refining Limited predicted today that annual production from present Western world reserves of uranium will be inadequate to meet demands of the nuclear power industry beyond 1973. He also said "it is difficult to see anything but a very substantial increase in the price to be paid for the raw material of their nuclear fuel."

Mr. Gilchrist commented in the company's annual report, which was released today by Hon. Jean-Luc Pepin, Minister of Energy, Mines and Resources. He emphasized the urgent need to find and develop new uranium orebodies.

"Firm orders for nuclear power reactors have to date exceeded, and are continuing to exceed, all forecasts," Mr. Gilchrist said. "The total value of orders held by U.S. manufacturers alone exceeds \$6 billion. It is clear that the annual production possible from the western world's present reserves of uranium, proven and developed, will not meet the demand beyond 1973 and possibly not even in that year. The increase in demand from that time on, as well as the replenishment of the known resources, must be met by





production from hoped-for extensions of the proven reserves and to a much larger extent from orebodies that have yet to be found and developed.

"Some appreciation of the magnitude of the physical problem facing the mining industry is possible when it is realized that the 47,000 tons of  $U_3O_8$  required to be mined in 1975, and about double that amount in 1980, must be produced from ores that, from the evidence at hand, will not average more than 2-1/4 pounds of  $U_3O_8$  per ton. Therefore, in 1975, at least 42 million tons of ore will have to be mined and processed, and 80 million tons in 1980. In 1959, the year in which the western world produced the peak annual output of 43,350 tons of  $U_3O_8$ , the ore processed averaged slightly less than two pounds per ton.

"It should also be recalled that the capital and pre-production investment required for mining and milling facilities varied between \$20,000 and \$33,000 per ton-day in the 1950's. On this basis, and allowing for higher costs, approximately \$4 billion will be required between now and the late 1970's for new production capacity. It is difficult to see anything but a very substantial increase in the price to be paid by the utilities for the raw material of their nuclear fuel, and indeed the trend to higher prices has begun. Utilities in the United States are now paying in excess of \$7 per pound for domestic uranium.

Mr. Gilchrist said uranium exploration activity is gaining momentum in Canada, but field work in 1967 was largely of a preliminary nature. More claims were staked than in any previous year, and the amount of ground now held for uranium purposes far exceeds the peak of the 1950's, but to date the





expenditure of time and money in actual exploration has not been large. The renewal of uranium exploration in the United States is further advanced than in Canada but notwithstanding 10,764,000 feet of exploration drilling in that country in 1967, estimates indicate that the reserves in the U.S. which can support production at a price of \$8 per pound increased by only 7,000 tons of  $U_3O_8$ , and that perhaps 100,000 tons had been added in the \$10 range. "As far as the rest of the western world is concerned," Mr. Gilchrist added, "it can be said that relatively little effort has as yet been put into the renewed search for uranium."

"If by the end of this year significant additions have not been made to what the western world now considers to be reserves," Mr. Gilchrist said, "much lower grade material than that processed in the past will have to be considered. Moreover, the time remaining in which to prepare such material for production is too short even now, and will be drastically so by the time another year has passed."

"The governments and utilities that have committed themselves to nuclear power programs will have to take a much more active and realistic interest in the uranium supply problem in order to be certain that the necessary quantities of  $U_3O_8$  will be available when needed. There must be recognition of the hard fact that while an organized exploration effort offers no guarantee that the required quantities of material will be available by any given date, the growing need for additional electrical energy has imposed very rigid start-up dates for the reactors now on order."





The Annual Report shows that for the first time since 1959 there was an upturn last year in uranium production in Canada. The output of all Canadian companies amounted to 8,357,000 pounds of  $U_3O_8$ , a million pounds more than in 1966.

Long-term contracts in excess of 17,000 tons were entered into in 1967, bringing to 39,000 tons the amount of uranium committed by Canadian producers for delivery between 1968 and 1983. Negotiations for additional sales are in progress with a number of utilities and governments.

Mr. Gilchrist reported Eldorado has begun construction at Port Hope of a plant to produce zirconium alloys, and studies have been advanced for new facilities to carry uranium processing to the stage of uranium hexafluoride, the form in which uranium is fed to the diffusion plants for enrichment. "Since most of the world's nuclear reactors will employ enriched fuel, most of Canada's uranium sold abroad will eventually be enriched," Mr. Gilchrist said. "It is therefore in the national interest to carry uranium processing to this further stage, and Eldorado, with its existing  $UO_3$  refinery and its body of expertise in uranium processing, is in an advantageous position to pursue this objective."

Mr. Gilchrist said the company will need extra capital to finance the expansion of facilities. "A sizeable part of the company's





surplus funds was used to finance the 12,000-ton uranium contract Eldorado holds with the United Kingdom Atomic Energy Authority," Mr. Gilchrist said. "At year-end this long-term receivable stood at approximately \$25,700,000. To finance the substantial capital expenditures proposed, it will be necessary for the company to borrow rather large quantities of capital during the next four years unless early repayment of this large receivable can be arranged. To keep its loans as low as possible, the company will, in its long-term contracts, seek to arrange for substantial prepayments on future deliveries."

The Government's original investment in acquiring ownership of Eldorado in 1944 was \$9,246,877. To the end of 1967 the company has returned to the government \$34,740,000 in the form of dividends and redemption of shares; has paid \$28,969,000 in income taxes; contributed \$4,045,000 in royalties to the Province of Saskatchewan; and paid grants in lieu of municipal taxes to four municipalities totalling almost \$4,000,000.

